

energy to its solution. In this way seismology, atmospheric electricity and meteorological optics with their innumerable concrete problems interested him immensely and he became an authority on all these subjects. It was the exhibition by Sir Napier Shaw at the British Association meeting in Dublin of a diagram showing unexplained pressure waves on a microbarograph record which led to his outstanding paper on the great Siberian meteor, and it was the audibility in England of gun-fire on the Western Front during the War of 1914-18 which led directly to his major work on the transmission of sound, which has given us so much information about the temperature of the upper atmosphere. Practically the whole of Whipple's numerous publications deal with problems of this nature. Whether interest in such matters to the exclusion of more fundamental problems is in itself a good or a bad trait I am not prepared to say; but it played a great part in Whipple's success at Kew. Instead of being absorbed in his own investigations he took a personal interest in the work of the young men of science working under him, leading and helping them without any thought of credit to himself. The consequence was that the staff at Kew produced during Whipple's control a series of papers on seismology and atmospheric electricity which are of fundamental importance, and of which he and the Meteorological Office had every reason to be proud. With the passing of Dr. Chree, Kew Observatory ended an epoch of geomagnetic research; with Dr. Whipple commenced an epoch of research in seismology and atmospheric electricity which will be equally remarkable and has already enhanced the great reputation of Kew Observatory.

Whipple served on the National Committee for Geodesy and Geophysics of the Royal Society and was one of the British delegates to the International Geophysical and Geodetic Conference which met in Washington in September 1939. For a number of years he was chairman of the Seismological Committee of the British Association. He served on the Council of the Royal Meteorological Society and was president in 1937 and 1938. From 1930 until 1932 he was a member of the Board of the Institute of Physics.

From all this it will be seen that Whipple was an able man of science who was always ready to help and serve others; it is therefore not surprising that his death is felt in a very wide circle of friends. His wife died in 1926, as the result of a motor accident, and he leaves one son, who is following the scientific traditions of the Whipple family.

G. C. SIMPSON.

Dr. G. T. Bennett, F.R.S.

In Dr. Geoffrey Thomas Bennett, who died after an operation on October 11, Cambridge loses one of her most characteristic sons: able in diverse ways, conscientious and thorough in all he was willing to undertake, and, for the most part, conservative in his scientific interests.

Born in London on June 30, 1868, he was at University College School, under Mr. H. W. Eve, and became in due course a scholar of St. John's College, Cambridge. Even then, the finish of the style of everything he wrote was remarked. In 1890 he was the senior wrangler, with distinction also in the second part of the Mathematical Tripos in 1891. It was in 1890 that Miss Fawcett, who, I believe, afterwards gave herself to the service of education

in London, under the L.C.C., was placed above the senior wrangler. Soon after Bennett's consequent election to a fellowship at St. John's College, he followed a precedent set by A. G. Greenhill, and became mathematical lecturer and fellow at Emmanuel College. Here he continued to live, in rooms increasingly in tune with the rising style of amenity in Cambridge, and for many years, until his death, had presided, as senior fellow, at the College dinner.

Until after the War of 1914-18, mathematical lectures in Cambridge were organized for groups of colleges separately, and Bennett would lecture for the group of which Emmanuel was part, possibly an enigma for some of his hearers; and he offered, besides, an algebraical lecture on line-geometry open to the whole University. His masterly instinct for the geometry of mechanism was doubtless a bond of union with James Bennet Peace, who had graduated in 1887 from Emmanuel College, then teaching in the Engineering School (afterwards secretary of the Syndics of the University Press). In the afternoons he would often be seen sallying out on his summer or winter bicycle (according to the season), for which the gearing had been arranged from a formula he gave to the cycle-agent, G. B. Howes. In the evenings he would often be found at the University concerts, and you would learn on inquiry that he had been giving attention to the mathematical aspects of music.

During the War of 1914-18 Bennett was for some time one of the party engaged, at Whale Island, in research in anti-aircraft gunnery; and passed to the gyrostatic compass department of the Admiralty at Slough, where he continued until after the armistice; one remembers his characteristically trenchant remarks in regard to English knowledge of this compass. Since about 1920 he had withdrawn from any overt connexion with the mathematical school at Cambridge; but his touch could be recognized in various disclosures of his continuing interest in mathematical curiosities of many kinds, including models, of which he encouraged a fine collection at Emmanuel College, and boomerangs. The late Major MacMahon, for example, in his painstaking work in regard to the regular division of the plane, was in close touch with Bennett; and his help is acknowledged in a certain striking book on school algebra. It is to be expected that his drawers, when explored, will bring many interesting mathematical results to light.

In 1892, in more halcyon days than these, Cayley presented to the Royal Society a paper of 150 quarto pages, devoted to the investigation of the primitive roots of a composite modulus (complex as well as real). This was presumably developed from the essay he wrote for the Smith's Prize two years after his degree, and would amply suffice to establish his status as a mathematician. He became a member of the London Mathematical Society in that year; of that Society he was later (1908-11) on the Council, and secretary during 1915-16. He became a fellow of the Royal Society in 1914, and served on its council during 1936-38. At the time of his death he was a fellow of University College, London.

The evidence of his interest in the kinematical questions, in which he was superlative, may be indicated by reference to several of his published papers. In the *Philosophical Magazine* for June 1905, he wrote a historical note in regard to the parallel motion remarked by Sarrut, in 1853, giving a drawing of the mechanism employed. This seems not to be mentioned

in the enthusiastic lecture on "The Mechanical Conversion of Motion" given by Sylvester to the Royal Institution in 1873, which begins with the Peaucellier Cell of 1864. In the *Proceedings of the London Mathematical Society* we find "The Composition of Finite Displacements and the Use of Axodes" (1910), "Deformable Octahedra" (1911), "The Skew Isogram Mechanism" (1913), and later, "The Three-bar Sextic Curve" (1920). But a more abstract paper of 1910 is on the double six of lines on a cubic surface; in an appendix to this he suggests a diagram, to which he returns in 1911, for representing all the lines; this is in fact a graphical form for Steiner's set of three complementary systems (1856), to which he does not refer.

In a university which accepts the double task of giving instruction and care to all who are working for its examinations, and of fostering a lively interest in the development of knowledge, many of the best brains among the teachers will be drawn, by loyalty

or discipline, into the former task; and those who feel the importance of the latter may have a hard struggle. It is one of the complaints one has so often heard about some of the provincial universities. In the comparatively easier circumstances at Cambridge, one may say that Bennett made a wise compromise. The writings which he has left will remain as evidence of his great power and ability. H. F. BAKER.

WE regret to announce the following deaths:

Sir Robert Falconer, K.C.M.G., president of the university of Toronto, aged seventy-six.

Prof. I. Traube, formerly of the Technische Hochschule, Berlin, and recently of Edinburgh, a well-known physical chemist and a pioneer in the field of surface chemistry, aged eighty-four.

Prof. Einar Lönnberg, the well-known Swedish geologist, died on November 21, 1942, and not on October 21, 1943, as stated in NATURE of November 6.

NEWS and VIEWS

Royal Society: Medal Awards

HIS Majesty the King has been graciously pleased to approve the recommendations made by the Council of the Royal Society for the award of the two Royal Medals for the current year as follows: to Sir Harold Spencer Jones, Astronomer-Royal, for his determination of the solar parallax and of other fundamental astronomical constants; to Dr. E. B. Bailey, director of H.M. Geological Survey, for his distinguished contributions to the knowledge of mountain structure and his studies on the tectonics of vulcanism.

The following awards of medals have been made by the president and Council of the Royal Society: Copley Medal to Sir Joseph Barcroft, emeritus professor of physiology in the University of Cambridge, for his distinguished work on respiration and the respiratory function of the blood; Davy Medal to Prof. I. M. Heilbron, professor of organic chemistry in the Imperial College of Science and Technology, London, for his many notable contributions to organic chemistry, especially to the chemistry of natural products of physiological importance; Sylvester Medal to Prof. J. E. Littlewood, Rouse Ball professor of mathematics in the University of Cambridge, for his mathematical discoveries and supreme insight in the analytical theory of numbers; Hughes Medal to Prof. M. L. E. Oliphant, Poynting professor of physics in the University of Birmingham, for his distinguished work in nuclear physics and mastery of methods of generating and applying high potentials.

Retirement of Prof. O. T. Jones, F.R.S.

THE retirement of Prof. O. T. Jones from the Woodwardian professorship of geology at Cambridge on September 30 took many of his friends by surprise, so little sign did he show of his approach to the age limit set by the University Statutes. He went to Cambridge from Manchester in 1930, well fitted by his researches in Wales to foster that interest in Lower Palaeozoic stratigraphy and physiographical problems which has long been associated with the Cambridge school of geology. In this work he was

prodigal of personal effort, and the intense fervour with which he threw himself into unravelling the complexities of 'slumping' in the Silurian rocks of Denbighshire is not likely to be forgotten by his staff and students of that time. By no means, however, did he limit himself to these fields, but continually found fresh interests to expound in which his insight seldom failed to bring out new points of capital importance. Indeed his tenure of the chair will be notable for its encouragement of interest in allied subjects; he established a close liaison with experimental geophysics and he was equally ready to collaborate with botanists and archaeologists over the problems of the Fenland and Breckland of East Anglia, and with engineers in the laboratory study of stressed rocks.

That Prof. Jones's broad outlook was not limited to research was shown by the incorporation of practical work on sediments into the elementary geological course at Cambridge, with the establishment of a special laboratory under Mr. Maurice Black. Nor was it geographically circumscribed; in particular, his intercourse with the United States on Lower Palaeozoic and geophysical problems, especially through the collaboration of Prof. R. M. Field of Princeton University, should continue to bear fruit in promoting scientific amity between the two shores of the Atlantic. Though war sadly depleted his department of students, it was quite unable to quell his determination to carry on field-work, and it is confidently hoped that his years of retirement will see the publication of further important research on the Lower Palaeozoic of his own country of Wales.

Abraham Colles (1733-1843)

NOVEMBER 16, 1843, marks the centenary of the death of Abraham Colles, the eminent anatomist and surgeon of Dublin. He was born in 1773 at Milmont, near Kilkenny, and received his medical education at the University of Dublin, where he obtained his diploma at the Royal College of Surgeons in Ireland in 1795. He afterwards went to Edinburgh, where after two winter sessions he became M.D. He then made a journey, most of the way on foot, to London,